Project Fact Sheet

CEC / SMUD Regen Project 3.5 Optimization of Residential PV Systems

GOALS

Research and develop a PV module/laminate product and associated mounting and wiring system that:

- Will be accepted by mainstream consumer markets.
- Reduces or eliminates penetrations of the roofing membrane (flashed "feet") for new construction.
- Functions as part of a weatherproofing system, though not necessarily a "Building Integrated PV" product;
- Presents an appearance that is more consistent with conventional roofing, and minimizes or eliminates the visibility of mounting or wiring hardware from the ground;
- Works with the majority of the roofing products predominant in sloped-roof residential construction in California, including Spanish tile and concrete tile.
- Eliminates the need for inter-module hardwiring and conduit on the roof.

Research and develop a Power Conditioning Unit (PCU) that:

- Tracks array maximum power point.
- Inverts DC to AC power at no less than 93% efficiency.
- Operates through a wide range of DC input voltages to enable single-string arrays of various sizes.
- Incorporates all AC and DC switching and protective devices.
- Incorporates design flexibility, such as array size and battery usage.
- Installs in significantly less time than existing PCU arrangements.

Research and develop an advanced, low-cost PV monitoring system that:

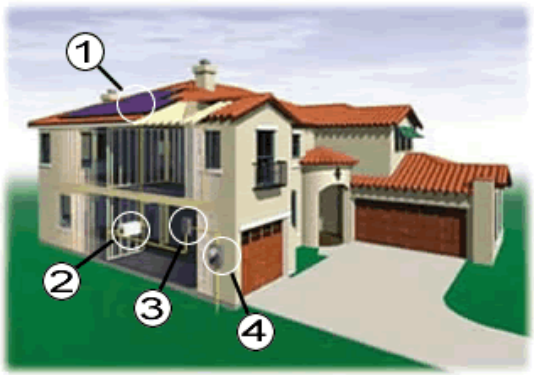
- Displays real-time "solar fraction"
- Displays the monetary value of the solar electricity the system has generated
- Indicates when the solar electric system is selling electricity to the utility
- Displays the status of the battery bank (if applicable).
- Provides feedback indicating acceptable operation
- Records operating data
- Can transmit data to a remote location for viewing on the Internet if cost effective.

PROJECT DESCRIPTION

Astro Power will research and develop components and an integrated system design for its packaged residential solar electric power systems optimized for the California market. To accomplish this, Astro Power will research and develop an advanced:

1) PV module/laminate product and associated mounting and wiring system;
2) Power Conditioning Unit (PCU) for grid-connected PV systems;
3 & 4) Low-cost PV system meter appropriate for the new module/laminate, PCU, and system design configuration.

Astro Power will integrate the advanced module/laminate, PCU, and meter elements into a line of packaged residential PV systems. Through these development activities, Astro Power will improve performance, aesthetics, functionality, usability, and reduce consumer cost by approximately 20%.



BENEFITS TO CALIFORNIA

As a result of this work, the installed cost of residential PV systems shall be reduced by approximately 20%. The cost of module/laminates will be approximately the same in $/watt, but the installation costs will be greatly reduced, and consumer acceptance of aesthetic impacts will be improved. The PCU will be more efficient due to MPPT, in the case of battery back-up systems as much as 35% more efficient. The system monitor will be greatly improved both in terms of cost and functionality. Most importantly, the integrated, easy-to-install systems will be much more acceptable to mainstream installation and builder trades currently available.

FUNDING AMOUNT

Commission	$1,127,000
Match	$1,197,000
Total	$2,324,000

PROJECT STATUS

Project is underway.

FOR MORE INFORMATION

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